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Equity in the fiscal benefits associated with private health expenditures in Portugal: 2000 - 2010

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Abstract

The objectives of this work project are to, a) provide an analysis on the extent of progressivity of the fiscal benefits associated with private health expenses in Portugal between 2000 and 2010, and b) assess the equity implications of a reduction of these fiscal benefits proposed by the Memorandum of Understanding. Using the methodology of concentration and Kakwani progressivity indices, the fiscal benefits was found to be pro-rich during this period with a progressivity index of -0.213 in 2010. A simulation of a reduction of these fiscal benefits estimated that these fiscal benefits will become pro-poor for the fiscal year 2013 with a progressivity index of 0.335.

Keywords: Fiscal benefits, private health expenses, Kakwani index, MoU

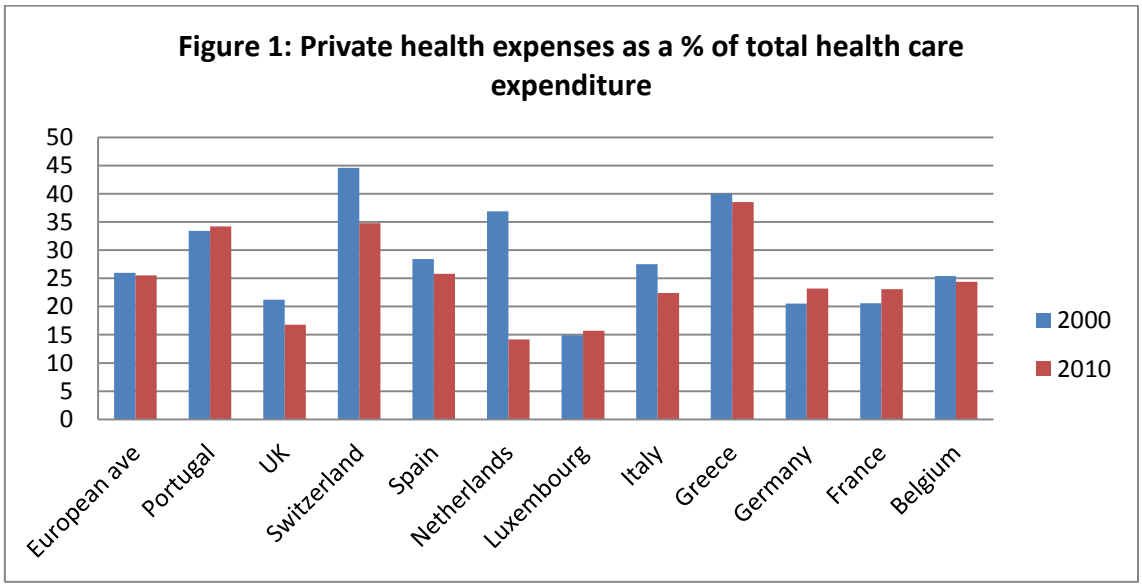
I. Introduction

One of the main objectives of the National Health System (SNS) in Portugal is to promote equity in access to health care, as well as in the finance of health care payments. With respect to the finance of health care, promotion of equity is vital as to not financially burden the economically disadvantaged individuals. Bearing this in mind, equity in the finance of health care payments should be based on the individual´s ability to pay, regardless of his/her economic position (van Doorslaer et al 1993). However, Wagstaff et al (1999) shows that the finance of total health care payments are regressive in Portugal.[1] This implies that the poorer individuals pay a higher proportion for health care in relation to their income, than richer individuals. The main reasons for this situation are due to the high proportion of the so-called private health expenses

[1] This paper is the most recent analysis on the equity in the finance of the total health care payments, with comparisons with other nations. The analysis is based on data for 1990.

(PHE) which in turn are highly regressive,[2] and the fiscal deductions associated with such payments which not only decrease the progressivity of the income tax, but also reduce equity in the finance of health care as a result of richer households obtaining more of the benefits associated with these fiscal deductions (Pinto and Santos 1993; Pereira and Sousa 2001; CSFSNS 2007).[3]

Private health expenses are one of the major sources of the finance of health care in Portugal.[4] Figure 1 below compares Portugal with other European nations with respect to PHE as a percentage of total health care expenditure for the years 2000 and 2010.



Source: WHO World Health Statistics 2013.

As we can see from the figure above, PHE plays an important source of finance of health care in Portugal. In 2010 it contributed to about 34% of total health care expenditure, with only Switzerland and Greece reaching higher values. In fact PHE as a

[2] Private health expenses are those health payments directly paid by the consumer at the time of receiving the particular health care. See Wagstaff et al (1999), as well as section IV in this work project for a comparison of the progressivity indices of these payments with other nations.

[3] The taxpayer is able to reduce the amount of tax he/she owes by deducting a portion or all of its PHE. "Fiscal benefits" and "fiscal deduction" are used interchangeably throughout this work project.

[4] Private health expenses are broken down into out-of-pocket health payments, and private health insurance. These form the majority of the total private expenditure on health care. Other sources include direct and indirect taxes, as well as social insurance, which form the bulk of public expenditure on health care in Portugal.

share of total health care payments in Portugal is higher than the European average. Previous papers (Pereira and Pinto 1992; Pinto and Santos 1993; Pereira 1996; Pereira and Sousa 2001; CSFSNS 2007) have documented that not only do PHE play a major role in the finance of health care in Portugal, but that these payments were regressive throughout the 1980s and 1990s. Moreover as mentioned above in Wagstaff (1999), the regressive nature of these payments contribute to the overall regressivity of the total finance of health care in Portugal. The main reason for the regressivity of PHE is due to the regressivity of the payments for medication and medical services, which constitute over 80% of PHE throughout the 1980s and 1990s (CSFSNS 2007). No previous studies to date have provided updated figures on the progressivity of PHE.

The introduction of fiscal benefits associated with PHE was an attempt by the Portuguese government to encourage consumers to purchase more private health care, as a means to slow down and decrease public expenditure related to health care, during the late 1980s. Consequently, Portugal became one of the most generous nations with respect to these fiscal benefits.[5] As mentioned above, one of the reasons for the regressivity of the finance of health care in Portugal is due to the generosity of these fiscal benefits. Previous studies (Pinto and Santos 1993; Pereira and Sousa 2001; CSFSNS 2007) have shown that these fiscal deductions not only make income tax less progressive, but also it contributes to the reduction of equity in the finance of health care because it is the richer individuals who receive the majority of these benefits. This of course gives incentives to purchase more private health care.

Moreover, these fiscal benefits are also inequitable as it only benefits individuals who qualify to pay income tax. CSFSNS (2007) showed that in 2000, about 44% of

[5] Throughout the early 1980s, 50% of certain PHE was allowed to be deducted from the tax amount owed by the individual. In 1987, 100% of all PHE could be deducted. The fiscal change in 1999 brought down the deduction rate to 30%. However, even with this decline, Portugal has one of the highest deduction rates related to PHE. See CSFSNS (2007) for a comparison with other nations.

Portuguese households, although contributed about 40% of the total PHE, were exempt from these benefits because of their insufficient incomes to pay tax, either because their incomes were too low for tax purposes or they paid no tax as a result of the "specific deductions" on employment and pension income.[6] This begs the question if past policy considerations to address the unequal distribution of these fiscal benefits have had its intended impact. Oliveira and Pinto (2005) showed that the introduction of limits on certain PHE in 1995, and the decrease in the allowed deduction of PHE (100% down to 30%), have had only a marginal decrease in the inequity of these fiscal benefits.

A significant change came in 1999 when the calculation of these fiscal deductions was altered.[7] This change was introduced to address the inequity of the fiscal benefits. However, this modification has been rarely examined. To date, CSFSNS (2007) demonstrated that there was a significant decrease in the inequity of these fiscal benefits in the year 2000, but was still a long way off to be considered an equitable system. Since this fiscal deduction does not depend on the income level of the household, which was the case before the fiscal change in 1999, the fiscal benefits associated with PHE should follow the distribution of PHE as a minimum requirement for this fiscal benefit system to be considered equitable (CSFSNS 2007).

With the establishment of the Memorandum of Understanding (MoU) to reduce public expenditures as well as the objectives set out in the Plano Nacional de Saúde (2010-2016), new measures have been introduced to address the inequities of the health sector. With respect to the fiscal deductions associated with PHE, stricter limits on such deductions have been implemented on richer individuals, as well as a two-thirds cut of

[6] "Specific deductions on income" are deductible from income prior to the calculation of tax.

[7] Prior to 1999, the fiscal deduction was deducted from the taxable income of the taxpayer. This benefited richer individuals as the deduction depended on the marginal tax rate. Thus as the tax rate rose, so did the fiscal benefits. As a result of the new fiscal rule introduced in 1999, the fiscal deduction was deducted directly from the tax amount owing to the State. This way the deduction did not depend on the marginal tax rate, and hence neither on the income level of the household.

the deduction rate (from 30% to 10%).[8] To date, no prior research has provided audiences about the effects of these changes as yet.

Given the lack of recent research into the abovementioned matters, the objective of this work project is to answer the following question: have the fiscal benefits associated with PHE become more equitable? To answer this, we will look at the progressivity of these benefits between 2000 and 2010. Furthermore, an estimation of the change in these fiscal benefits in 2011 is simulated. This work project will also consider if the change in the fiscal tax system i.e. fewer tax brackets and higher tax rates, for the fiscal year 2013, will have a positive impact on the equity in these fiscal benefits.

The work project is organized as follows: section II provides a brief critical review of previous studies with an emphasis on past empirical evidence on the equity of the fiscal benefits associated with PHE as well as the different measurement techniques used for the purpose of this work project, section III establishes the data and methodology used to measure equity as well as the variables used, section IV portrays the results and equity implications of the analysis, and finally section V concludes.

II. Literature review

International recognized papers, Wagstaff et al (1989), Wagstaff (1992) and Wagstaff et al (1999) form the benchmark of studies related to the finance of health care, across various nations. The methodology of concentration and progressivity indices used in these papers to measure the equity of the finance in health care, are the same tools used in this work project. To measure this equity, the method first proposed by Kakwani (1977) to measure the progressivity of taxes and thus, its equity can also be used to measure the progressivity of the finance in health care. Using these methods, the

[8] See Appendix A for the fiscal rules concerning the fiscal deductions associated with PHE.

equity of the fiscal benefits associated with PHE can likewise be measured. This methodology is widely used in equity analysis in various health finance papers (Pereira and Pinto 1992, van Doorslaer et al 1993, Pinto and Santos 1993, Pereira 1996, Parker and Wong 1997, Kakwani et al 1997, Pereira and Sousa 2001, CSFSNS 2007, O´Donnell et al 2007).

Related to studies in respect of fiscal benefits associated with PHE, Pereira and Pinto (1992) study showed that Portuguese households with less income received lower fiscal benefits associated with PHE. Lower reimbursement rates on health products, submits poorer households to purchase less private health care. As a result, these families have less health expenses to declare as a deductible. At the same time, most poor households while purchasing private health care, are often exempted from paying taxes and therefore do not qualify for these fiscal benefits. However, no concentration or progressivity indices for the fiscal deduction were presented, and only assumptions about the progressivity of these benefits were stated in their paper.

Pinto and Santos (1993) showed that the fiscal benefits related to PHE decreased the progressivity of the income tax in Portugal. The study was conducted for the year 1989.[9] Although this study provided audiences with important information about this fiscal benefit system, the study was based on a sample of tax declarations. The fact that Pinto and Santos (1993) did not make use of the household budget survey, they failed to take into account the number households who are exempt from paying taxes, and thus are disqualified from these benefits. This of course has an expected negative impact on the progressivity of these benefits, and thus further increases the inequity of these fiscal benefits. Moreover, its equity over time could not be observed as the study only focused on one time period.

[9] During this year, the deduction was based on taxable income therefore the deduction depended on the marginal tax rate. The higher the marginal tax rate, the higher will be the deduction. As a result this benefited the richer households where income levels were higher than that of poorer households.

A more comprehensive study on this matter was conducted by Pereira and Sousa (2001). The study was based on the Household Budget Survey for 1980 and 1990 (IOF 1980 and 1990), and additionally Kakwani indices were applied directly on this fiscal deduction. Moreover, this allowed for a descriptive analysis on the progressive evolution of these fiscal benefits during this period. The research showed that the fiscal deduction associated with PHE was progressive, implying that households with higher income levels received more of the benefits related with the deduction. However, this reasoning is incorrect as "progressive" means it is pro-poor.[10] Verbist (2004) showed that in order to measure the progressivity of a "tax credit", the Gini and concentration indices should be swapped around to correct for the sign of the Kakwani index.[11] Although not a criticism of the work done in Pereira and Sousa (2001), the Kakwani index calculated in this work project takes into account the difference between the concentration indices of PHE and the fiscal benefits related to PHE, and not the difference between the concentration and Gini indices of these fiscal benefits and income, respectively, as in Pereira and Sousa (2001). The Kakwani index is computed in this way as a result of the change in the way the fiscal deduction related to PHE is formulated since 1999, as mentioned in the introduction section of this work project. The aforementioned alteration will be considered in the analysis here.

The most recent analysis on the distribution of the fiscal benefits associated with PHE in Portugal was conducted by CSFSNS (2007). This study added on the household incomes and health expenses for the year 2000, and moreover included the alteration of the fiscal deduction. However, the paper does not provide progressivity values for these fiscal benefits. Thus, readers are not able to observe the extent of equity in the fiscal

[10] See section III for the explanation.
[11] The fiscal deduction related to PHE can be regarded as a tax credit or tax saving. See section III for an explanation of how the progressivity of the fiscal deduction is measured.

deduction throughout the periods under study.[12] Nevertheless, the paper does provide a visual representation of its distribution. It shows that the distribution of the fiscal benefits follows that of household income, rather than following the distribution of PHE for this fiscal benefit system to be considered equitable. The paper also takes into account households, who although contribute to the finance of health care, do not reap the rewards from these fiscal deductions as their incomes are not sufficient enough for tax purposes. This is one of the main issues that contribute to the inequity of the fiscal benefits related to PHE. The same approach will be used in this work project.

III. Data, variables and methodology

III.I Data and variables

The data used for this work project was collected from the Household Budget Surveys (IOF 2000, IDEF 2005 and 2010) conducted by the National Institution of Statistics of Portugal (INE).[13] From these surveys, we are able to extract the income and PHE values of the Portuguese families. The surveys are based on population based data, with representative samples of both the Portuguese mainland and the Autonomous Regions of the Azores and Madeira. The sampling unit used in these surveys is the aggregate household, and thus this analysis will be based on a comparison between households. The methodology in conducting these surveys is internationally based which allows for a comprehensive comparison with other nations.

However the data does have limitations. Survey data may suffer from recall bias due to the infrequency that certain PHE are made (O´Donnell et al 2008). Moreover, tax payments by households are not included in all the surveys.[14] Consequently, deriving the relative gross incomes of households was simulated by using the applicable tax rates

[12] CSFSNS (2007) uses three sets of Household Budget Surveys: 1980, 1990 and 2000.
[13] The number of households included in the analysis was the following: 2000 – 10020; 2005 – 10403; 2010 – 9489.
[14] Tax payments were only included in the 2000 survey. No tax payments were present in the 2005 and 2010 surveys.

and tax rebates in each year.[15] The aforementioned method was applied to all the surveys under study to enhance more consistency throughout the analysis. Given the limitations of these surveys, these types of datasets were used by several other authors (Wagstaff et al 1989; Pereira and Pinto 1992; Wagstaff 1992; van Doorslaer et al 1993; Pereira 1996; Parker and Wong 1997; Wagstaff et al 1999; Pereira and Sousa 2001; CSFSNS 2007), and accordingly provides motivation to use these surveys to provide consistent comparisons both at a national and international level with respect to equity issues. Households with zero or negative incomes were excluded from the above analysis.

The variables used for the analysis are, a) ability to pay defined as net household income, b) household PHE, and c) the fiscal deduction, which represents the fiscal benefits related to PHE. We consider using net household income (after deduction of tax payments and social security contributions) as it reflects the income available to households to engage in private health care payments. Household PHE consists of, a) medication prescriptions, b) medical appliances, c) medical services, d) hospital services, and e) private health insurance.

The fiscal deduction is the amount, related to PHE, that the households are able to deduct from their tax liability owed to tax authorities. The values for the fiscal deduction were simulated according to the fiscal rules of each year.[16] Moreover, all the components of PHE were assumed to be fully deductible, except for private health insurance where limitations are imposed.[17] Since the surveys do not separate which

[15] The calculation of gross incomes is important in the context of this analysis, as limitations on the amount of the fiscal deduction related to PHE were imposed on higher income households starting in 2011. These limitations depend on which gross income bracket the household belongs to. Moreover, these gross income brackets are also important to determine which households qualify for the fiscal deduction. As a result of "specific income deductions" households may not qualify for these fiscal benefits because of no incomes to declare for tax purposes. This is common among the poorer individuals where incomes are low.

[16] See appendix A.

[17] See appendix A.

PHE were purchased with a normal VAT rate, or with the special VAT rate of 6%, the total amount of each component of PHE was considered for the fiscal deduction. This of course poses a constraint on the below analysis, as there are limitations of how much PHE purchased with a normal VAT rate can be deducted as a fiscal deduction. Nevertheless, we assume that the full amount of PHE is deductible.

Furthermore, for a thorough comparable analysis between households, all the variables were homogenized by adult equivalent.[18] In past studies, only income was homogenized by adult equivalent, but more recent studies have now equivalised health payments (Wagstaff et al 1999; Pereira and Sousa 2001). Likewise, following the same reasoning in Wagstaff et al (1999), the fiscal deduction is also homogenized by adult equivalent to provide more consistency throughout the analysis. This homogenization allows us to compare households with different dimensions and structures.

III.II Methodology

Studies on the equity of finance in health care have concentrated on the measurement of the vertical equity i.e. to what extent do households with different incomes contribute differently to the finance of health care. To measure this vertical equity of the finance in health care, the Kakwani progressivity index has been used, which measures to what extent does a particular source of health finance moves away from proportionality.[19] Like many other authors (Wagstaff et al 1989; van Doorslaer and Wagstaff 1992; Wagstaff 1992; Wagstaff et al 1999; Pereira 1996; Pereira and Sousa 2001; CSFSNS 2007), the Kakwani index has been used to measure the relative degree of progressivity in the finance of health care, and consequently the extent of

[18] The OCDE equivalence scale was used where the first adult of the household is given a weight of 1.0, the remaining adults are given a weight of 0.5, and children under the age of 14 are given a weight of 0.3. The OCDE equivalence scale had to be constructed for the 2000 and 2005 surveys. For the 2010 survey the OCDE equivalence scale constructed by INE was used for the analysis.

[19] This index was formulated by Kakwani (1977) as a measure of tax progressivity.

equity in the finance of heath care. Consequently, the Kakwani index can similarly be used to measure the extent of equity in the fiscal benefits associated with PHE.

To define the Kakwani index, an understanding of Gini and concentration indices is required. The Lorenz curve relates the cumulative percentage of households, ranked by income from the poorest to the richest household, against the cumulative percentage of household income, and in the end shows how the distribution of income moves away from the line of perfect equality (45-degree line running from the bottom left-hand corner to the top-right corner of the graph). The Gini index measures the magnitude of the inequality in income distribution across households. The index varies from 0 to 1, where 0 indicates that income is distributed equally among the households, and 1 when total income pertains to one household.

Likewise, we can define concentration curves and indices to measure the distribution of PHE and the fiscal deductions. The concentration curve plots the cumulative percentage of a health variable against the cumulative percentage of households, ranked by a living standards measure (income), beginning with the poorest and ending with the richest. If the curve is below (above) the line of perfect equality, the health variable of interest takes on higher (lower) values among the rich. The concentration index measures the magnitude of the degree of income-related inequality in a health variable. This index varies between -1 and 1. If the index is -1, the poorest household supports the total value of the health variable, and when the index is 1, the richest household sustains the entire health variable. Moreover, if the index is 0, there is no income-related inequality.

The Kakwani index is defined as the difference between the concentration index and the Gini index:

$$\pi_K = I_C - I_G \tag{1}$$

where I_C is the concentration index, and I_G is the Gini index.

In the context of the finance in health care, when $\pi_K = 0$, health care finance is proportional i.e. all the households contribute to the finance of health care in equal proportion in relation to their income. When $\pi_K > 0$, health care finance is progressive i.e. the percentage of health payments increases, as income increases (thus it is pro-poor), and when $\pi_K < 0$ health care finance is regressive i.e. the percentage of health payments decreases, as income increases (accordingly it is pro-rich).

The above is the conventional method used to measure the progressivity of health payments (Wagstaff et al 1989; Wagstaff 1992; Wagstaff et al 1999; Pereira and Sousa 2001; CSFSNS 2007). However, the derivation of the Kakwani index for the fiscal benefits is somewhat different. Given the fact that the fiscal deduction does not depend on the household´s income level but rather PHE, a modification is done on equation (1) when measuring the progressivity of the fiscal deduction. In this case, the Kakwani index of this fiscal deduction is adjusted to the difference between the concentration indices of PHE and the fiscal benefits associated with PHE:

$$\pi_K = I_{CP} - I_{CFB} \qquad (2)$$

where I_{CP} and I_{CFB} are the concentration indices of PHE and the fiscal benefits, respectively.[20]

A positive Kakwani index of the fiscal deduction indicates that the fiscal benefits related to PHE goes relatively more to the lower end of the income distribution, and is thus pro-poor. A negative Kakwani index indicates that the fiscal deduction is pro-rich.

All the variables were adjusted for constant prices (base year being 2010). STATA 12 was used as the statistical software program for the above analysis. Gini and

[20] Verbist (2004) showed that to measure the progressivity of a tax credit, the sign of the Kakwani index should be reversed. Equation (2) above takes into account this modification.

concentration indices were calculated according to the "convenient regression" method (Kakwani, Wagstaff and van Doorslaer 1997). Consequently,

$$2\sigma_r^2\left(\frac{h_i}{\mu}\right) = \alpha + \beta r_i + \varepsilon_i \quad (3)$$

where σ_r^2 is the variance of the fractional rank, h_i is the health variable, and μ is the health variable´s mean. The OLS estimate of β is thus the estimate of the concentration index. The concentration index is therefore determined firstly by, ranking the households according to income, sorting it from the poorest to the richest household and applying sample weights to get the fractional rank for each household. Secondly, we obtain the variance of the fractional rank and multiply it by two and the health variable, and divide by the mean value of the health variable. Finally, we regress the result in the second step with the fractional rank to obtain the β estimate.

A Kakwani index is the difference between the concentration index and the Gini index. Bearing this in mind, we can adopt the "convenient regression" method used for concentration indices, and apply it to the calculation of a Kakwani index. Accordingly,

$$2\sigma_r^2\left(\frac{h_i}{\mu_h} - \frac{y_i}{\mu_y}\right) = \alpha + \beta r_i + \varepsilon_i \quad (4)$$

where μ_h is the mean value of the health variable, y_i is income, and μ_y is the mean value of income. By the applying the same steps as above, we obtain the β value which is an estimate of the Kakwani index.[21]

IV. Results

This section is divided into three parts. First, results are presented on the progressivity and thus its equity, of PHE between 2000 and 2010, comparing with earlier studies and furthermore examines if the situation has improved. Secondly, the

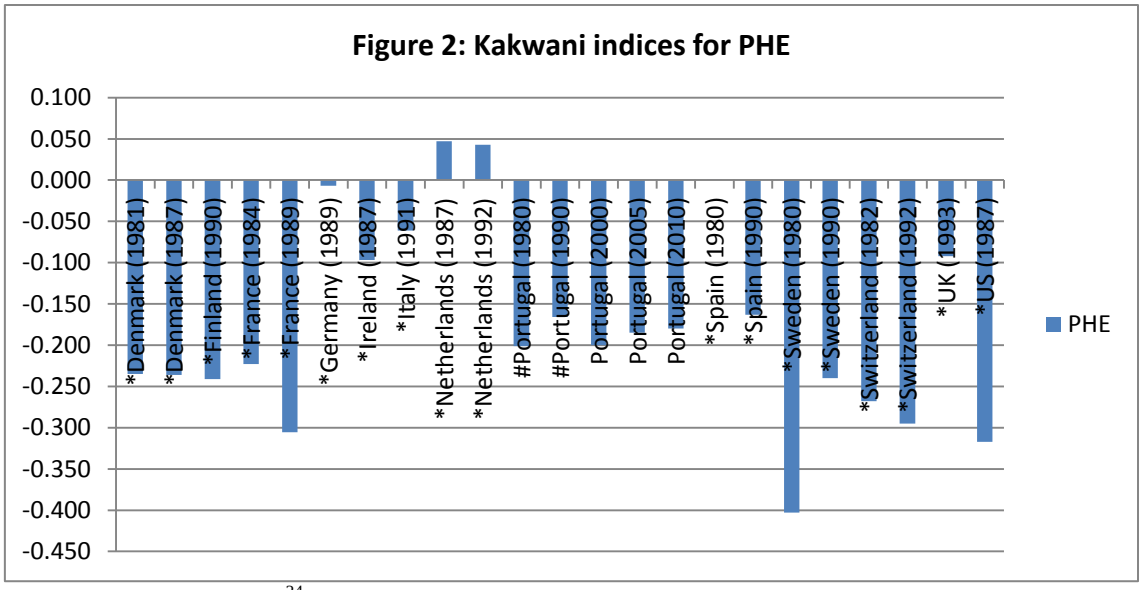
[21] Note that for the calculation of the Kakwani index for the fiscal deduction, we consider the difference of the concentration indices between PHE and the fiscal benefits associated with PHE, as mentioned earlier.

equity in the fiscal benefits related to PHE is presented for the same period, with comparisons with earlier research in Portugal and furthermore analyzes if these fiscal benefits have become more equitable. Finally, the simulation is conducted on the reduction of the new fiscal benefits according to the MoU.

IV.I Private health expenses

Figure 2 below illustrates the Kakwani indices of PHE for Portugal, as well as other European nations and the United States. During the 1980s and 1990s, the regressivity of PHE in Portugal was relatively high compared to other European nations. Moreover, this trend has maintained through the 2000s. The main reason driving this regressivity is the payments towards medication, which have had progressivity indices below -0.30 over the last three decades.[22] Not only are the poorer households the ones with the greatest need of health care but according to Pinto and Miguel (2006), Portugal has had one of the lowest compensation rates for medication over the years. Furthermore, the payments towards medication constitute nearly 50% of total PHE over the last decade across all households, with medication spending reaching over 65% of total PHE among the poorest households. This explains not only the high proportion of PHE in Portugal, but also why a significant portion of total medication spending rests on poorer households. Consequently, 20% of the poorest households support 26.34%, 23.05% and 21.41% of the payments towards medication, respectively for the years 2000, 2005 and 2010.[23] Another reason for this observed regressivity is due to the inequity of the fiscal benefits associated with these payments.

[22] See appendix B for the progressivity indices of the other components of PHE.
[23] See appendix C for the other components of PHE.



Source: Own calculations.[24] Note, a negative Kakwani index: pro-rich.

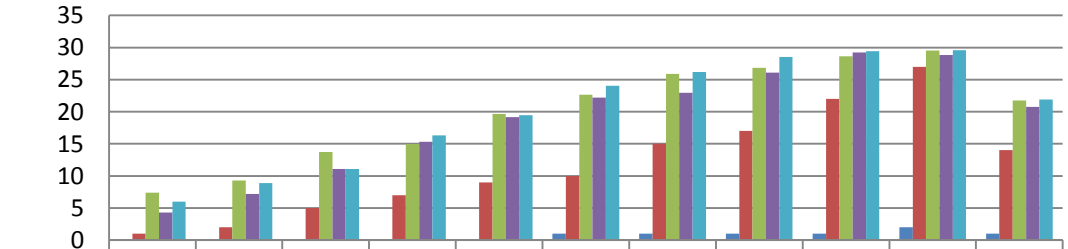
IV.II Fiscal benefits associated with PHE

We first look at the impact the several changes imposed on the fiscal benefits related to PHE has had on households throughout the years. Figure 3 below shows the percentage of PHE that households have recovered per income decile i.e. the percentage of PHE that households were able to deduct from their tax liability, throughout the decades. During the 1980s, only 1% of PHE were recovered by households.[25] The inclusion of all PHE to be fully deductible (100%) in 1987, improved the situation. However the most significant change came after 1999 where not only did the percentage of recuperated PHE increase from 14% in 1990 to about 22% throughout the 2000s, but also there was a significant increase for the poorer households. This was due to the switch to a tax credit benefit system which did not rely on the amount of income earned by the household. Even though this change benefited significantly poorer households in comparison to years past, when compared with the richer income deciles, the lower income households are still a long way off from achieving these higher percentages.

[24] Values for nations marked with # were taken from Pereira (1996). Figures for nations marked with * were taken from Wagstaff et al (1999).
[25] The main reason for this was due to the fact that only certain PHE was eligible for deduction purposes, as well as 50% of these PHE was deductible.

Furthermore, 20% of the poorest households received only 6.97%, 4.59% and 5.54% of the total benefits for years 2000, 2005 and 2010 respectively.[26] This is of concern, especially if the new change in the fiscal deduction in 1999 was meant to vastly improve the equity in the fiscal benefits, regardless of how much income the household earned.

Figure 3: Percentage of recuperated PHE per income decile



	1	2	3	4	5	6	7	8	9	10	Total
*1980	0	0	0	0	0	1	1	1	1	2	1
*1990	1	2	5	7	9	10	15	17	22	27	14
2000	7	9	14	15	20	23	26	27	29	30	22
2005	4	7	11	15	19	22	23	26	29	29	21
2010	6	9	11	16	19	24	26	29	29	30	22

Source: Own calculations.[27]

To see why the fiscal benefits related with PHE have still remained inequitable, below Figures 4 and 5 depicts the Lorenz and concentration curves of income, PHE and the fiscal deduction, respectively for the years 2005 and 2010.[28] These curves demonstrate the distribution of income, PHE and the fiscal deduction across households ordered from the poorest to the richest.

[26] See appendix C.
[27] The percentages for years 1980 and 1990 were taken from Pereira and Sousa (2001).
[28] Own elaboration.

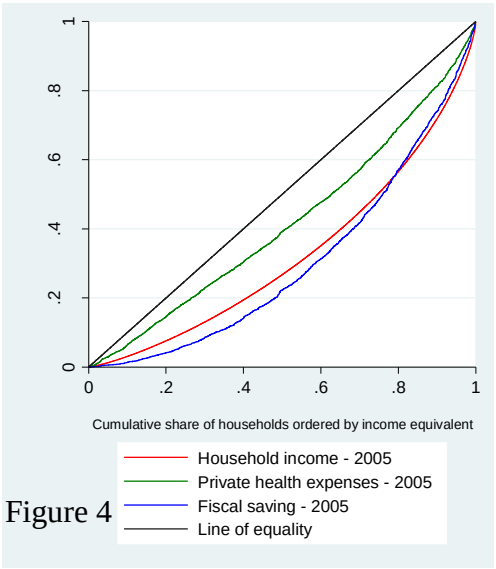


Figure 4

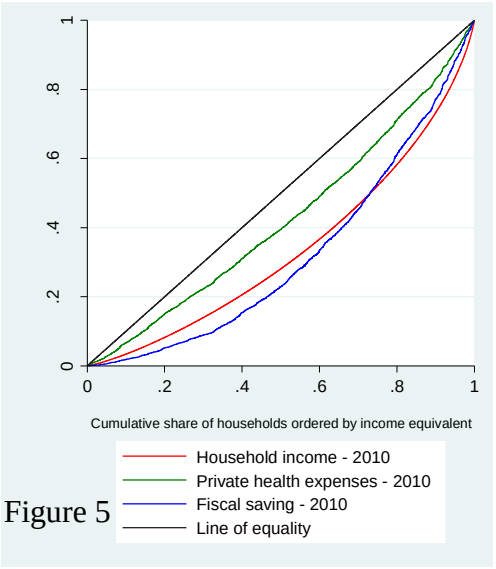


Figure 5

For this fiscal benefit system to be equitable, the distribution of the fiscal deduction (blue curve) should follow the distribution of PHE (green curve), as the way the fiscal deduction is calculated, it does not depend on how much income the households earn but rather on how much private health care is purchased by households. Nonetheless, the figures above illustrates that this is not the case.

Table 1: Kakwani indices	*1980	*1990	2000	2005	2010
Fiscal deduction	-0.328	-0.218	-0.197	-0.231	-0.213

Source: Own calculations.[29] Note: a negative Kakwani index: pro-rich.

Table 1 above displays the Kakwani indices for the fiscal deduction throughout the last three decades in Portugal. Although the resgressivity has dropped from -0.328 in 1980 to -0.213 in 2010, the fiscal benefits associated with PHE still remains regressive and thus the system remains inequitable i.e. it is pro-rich as the fiscal benefits goes relatively more to the higher end of the income distribution.

IV.III Simulation of reduction in fiscal benefits imposed by the MoU

To see the effects of the change in the fiscal benefits related to PHE imposed by the MoU, an equity analysis of this alteration is conducted, conditional on the old 2011 tax system and the new 2013 tax system. Below in Table 2, eight sets of concentration and Kakwani indices are provided (each set is numbered 1 to 8 in brackets). Set 1

[29] Kakwani indices for years 1980 and 1990 were taken from Pereira and Sousa (2001). For ease of understanding and correctness, the Kakwani indices for 1980 and 1990 were reserved.

provides us with values based on the deduction of only 30% of PHE conditional on the old tax system. Set 2 demonstrates indices based on the deduction of only 10% (plus 0% to households belonging to the top two income brackets) of PHE conditional on the old tax system. In set 3, the indices are based on the deduction of only 30% of PHE conditional on the new tax system. Set 4 depicts values based on the deduction of 10% (plus 0% to households in the top income bracket) of PHE conditional on the new tax system.

Sets five to eight, incorporate the limits imposed on these deductions according to which tax bracket the household belongs to. Set 5 shows indices based on the deduction of 30% (plus limits of 1100 euros to households in the top two income brackets) of PHE conditional on the old tax system. In set 6, the values depicted are based on the deduction of 10% (plus 0% to households in the top two income brackets, a limit of 1100 to households in the third top income bracket, a limit of 1150 in the fourth top income bracket, a limit of 1200 in the fifth top income bracket, and a limit of 1250 to households in the sixth top income bracket) of PHE conditional on the old tax system. Set 7 reveals indices based on the deduction of 30% (plus a limit of 1100 euros to households in the top income bracket) of PHE conditional on the new tax system. Finally, set 8 shows values based on the deduction of 10% (plus 0% to households in the top income bracket, a limit of 500 in the second top income bracket, a limit of 1000 in the third top income bracket, and a limit of 1250 to households in the fourth top income bracket) of PHE conditional on the new tax system.

Table 2	Old 2011 tax system		New 2013 tax system	
Effect of % change only	**Concentration index**	**Kakwani index**	**Concentration index**	**Kakwani index**
30%	(1) 0.363	(1) -0.213	(3) 0.271	(3) -0.122
10% + 0%	(2) 0.310	(2) -0.160	(4) 0.234	(4) -0.085
Effect of % change and limits				
30% + limits	(5) 0.349	(5) -0.199	(7) 0.262	(7) -0.112
10% + limits	(6) -0.187	(6) 0.336	(8) -0.185	(8) 0.335

Source: Own calculations.[30]

Considering only the effect of the percentage change (sets 1 to 4) conditional on the old and new tax system, we observe a decline in the concentration index of 0.363 to 0.310, and 0.271 to 0.234, respectively. This decline is due to the 0% deduction on richer households, rather than the two-thirds cut of the percentage deductible on PHE. In fact simulating a drop from 30% to 10% across the entire distribution of households, the concentration index increased slightly.[31] The Kakwani indices show that conditional on either system, the fiscal deduction becomes more progressive but still remains regressive (pro-rich). The higher Kakwani indices, conditional on the new tax system, are a result of the lower specific deductions on income. Consequently, more households qualify for the deduction related to PHE, and accordingly receive more of the fiscal benefits.

Allowing for the effect of the limits on the deduction of PHE (sets 5 to 8) we observe a more profound decline in the concentration indices; conditional on the old and the new tax system, the value drops from 0.349 to -0.187, and 0.262 to -0.185, respectively. As a result of a change in these fiscal benefits, the Kakwani indices, conditional on either tax system, estimates that the fiscal deduction will become progressive (-0.199 to 0.336, and -0.112 to 0.335, respectively). This decline in inequity

[30] Note: a positive concentration index indicates that the benefits are distributed more towards the richer households. A positive Kakwani index indicates that the benefits goes relatively more to the lower end of the income distribution and thus its pro-poor.

[31] Conditional on the old and the new tax system, the concentration index increased from 0.363 to 0.365, and 0.271 to 0.273, respectively. However this does not reflect the true change as households belonging to the top income bracket have zero deductions on PHE according to the new fiscal benefits.

of the fiscal benefits is a direct cause of the new strict limits imposed on the deduction on the higher income earning households.

An interesting point is that although the lower specific deductions on income allows more households to qualify for the deduction of PHE, the change to the new tax system with fewer tax brackets, actually slightly deters the progressivity of the fiscal deduction. Looking at sets 5 and 7, we see an increase of the Kakwani index. This is a result of lower specific deductions on income under the new tax system, and thus more households qualifying for the deduction. However, if we observe sets 6 and 8, the Kakwani index is the practically the same. This is a result of the fewer tax brackets in the new tax system. The fewer tax brackets imply that more households are more prone to the limitations on their deductions, and thus deter the progressivity of the fiscal deduction.

Nevertheless, overall the change from the old fiscal benefits to the new fiscal benefits, we observe that the fiscal deduction was pro-rich (Kakwani index -0.199) during 2011 and we can predict that the fiscal deduction will convert to pro-poor (Kakwani index 0.335) during 2013. We thus expect a vast improvement in the inequity of the fiscal benefits associated with PHE.

V. Conclusion

This work project aimed to answer the question about the extent of equity in the fiscal benefits associated with PHE. Using the methodology of Kakwani indices, one may conclude that during the 2000s, the fiscal deduction has remained regressive and inequitable. Even though there was a drop in the deduction rate from 100% in 1987 to 30% in 1999, the richer households are still able to deduct more of their health expenses than the poorer individuals as a result of no limits imposed on these deductions for the rich. Moreover, there has been an increase of the limits associated with payments

towards private health insurance between 2000 and 2010. Thus richer households are able to deduct more of these expenses and in turn receive more benefits. Furthermore, there has been an increase in the specific deductions on employment income, and not to mention the specific deductions on pension income. Not only do households with insufficient income to declare taxes are exempt from these fiscal benefits, but also households who declare their income often do not pay taxes as a result of these specific deductions. All of the above have contributed to the inequity of these fiscal benefits. Although the fiscal change of these benefits in 1999 did in fact reduce the inequity of such benefits, it still remains regressive thus still contributing to the inequity in the finance of private health care payments.

This work project also provided with a simulation of the reduction in the new fiscal benefits implemented in 2011. The analysis estimated that the fiscal deduction was pro-rich in 2011, and predicts that the fiscal benefits related to PHE will become pro-poor in 2013, and hence a vast improvement in the inequity of such benefits that we have seen in the past. This is mainly credited to the strict limits imposed on the deduction for richer households. We can thus assume that richer households will in the future restrict their private health spending which in turn will reduce the inequity in the payments towards private health care, and hence the total finance in health care in Portugal. However, caution must be noted here as the simulation of this change in fiscal benefits was simulated using the income and PHE figures for 2010. Future research is necessary using updated data to see if the analysis done in this work project reflects the expected effects to address the inequity of the fiscal benefits associated with PHE.

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Appendix A

Fiscal rules	2000	2005	2010	2011	2013
Amount of PHE allowed for deduction	30%	30%	30%	30%	10%
Amount of private health insurance allowed for deduction	25%	25%	30%	30%	10%
Limits on PHE	None	None	None	1100	0
Limits on private health insurance	*51/#102	*76/#152	*85/#170	*85/#170	*50/#100
Specific deductions on employment income	2749 euros	3237 euros	4104 euros	4104 euros	4104 euros
Specific deductions on pensions	7410 euros	8283 euros	6000 euros	6000 euros	4104 euros

Note1: values marked with * indicate a limit on non-married households; values marked with # indicate a limit on married households.
Note2: "Limits on PHE" for 2011 indicate a limit of 1100 euros for households belonging to the top two income brackets, while for 2013 a limit of 0 euros is imposed on households in the top income bracket.

Appendix B

Kakwani indices	1980	1990	2000	2005	2010
Medication	-0.332	-0.322	-0.344	-0.344	-0.325
Medical appliances	-0.030	-0.063	-0.125	-0.068	-0.143
Medical services	-0.028	-0.040	-0.093	-0.080	-0.052
Hospital services	0.199	0.164	0.003	0.167	0.142
Private health insurance	0.131	0.197	0.279	0.246	0.140
Total private health expenses	-0.201	-0.166	-0.200	-0.185	-0.180

Appendix C

2000								
Equivalent household income quintile	**Equivalent household income**	**Medication**	**Medical appliances**	**Medical services**	**Hospital services**	**Private health insurance**	**Total private health expenses**	**Fiscal deduction**
poorest 20%	9.41	26.34	12.67	11.71	4.27	0.96	17.92	6.97
poorest 40%	22.02	48.73	29.4	31.13	18.61	9.21	38.00	20.29
poorest 60%	36.93	66.66	47.28	45.09	39.04	14.68	54.33	36.28
poorest 80%	55.75	82.35	66.46	63.98	63.96	26.41	71.97	57.67
Concentration index	0.363	0.020	0.238	0.271	0.367	0.642	0.164	0.361
robust std err	0.007	0.018	0.037	0.032	0.097	0.097	0.018	0.022
pvalue	0	0.272	0	0	0	0	0	0
Kakwani index		-0.344	-0.125	-0.093	0.003	0.279	-0.200	-0.197
robust std err		0.019	0.037	0.031	0.097	0.096	0.018	0.022
pvalue		0	0.001	0.003	0.971	0.004	0	0.91

2005								
Equivalent household income quintile	**Equivalent household income**	**Medication**	**Medical appliances**	**Medical services**	**Hospital services**	**Private health insurance**	**Total private health expenses**	**Fiscal deduction**
poorest 20%	8.43	23.05	10.16	11.07	4.33	1.52	16.18	4.59
poorest 40%	21.08	45.36	24.02	23.9	8.94	7.01	33.09	15.23
poorest 60%	36.45	62.17	42.59	42.26	17.8	18.59	50.08	32.14
poorest 80%	57.62	80.59	65.3	65.93	49.22	36.75	71.35	57.5
Concentration index	0.352	0.008	0.284	0.272	0.518	0.597	0.167	0.398
robust std err	0.008	0.016	0.028	0.022	0.131	0.069	0.015	0.020
pvalue	0	0.615	0	0	0	0	0	0
Kakwani index		-0.344	-0.068	-0.080	0.167	0.246	-0.185	-0.231
robust std err		0.018	0.029	0.023	0.130	0.067	0.016	0.020
pvalue		0	0.019	0.001	0.202	0	0	0.022

2010								
Equivalent household income quintile	**Equivalent household income**	**Medication**	**Medical appliances**	**Medical services**	**Hospital services**	**Private health insurance**	**Total private health expenses**	**Fiscal deduction**
poorest 20%	8.75	21.41	15.62	10.93	3.49	5.34	15.98	5.54
poorest 40%	22.22	42.72	32.37	24.81	14.48	13.88	33.44	16.67
poorest 60%	38.89	64.37	48.96	40.86	30.79	25.39	52.15	35.38
poorest 80%	59.67	82.7	70.87	65.65	49.98	48.2	73.34	61.96
Concentration index	0.330	0.005	0.187	0.278	0.471	0.469	0.149	0.363
robust std err	0.006	0.013	0.048	0.025	0.114	0.045	0.014	0.018
pvalue	0	0.727	0	0	0	0	0	0
Kakwani index		-0.325	-0.143	-0.052	0.142	0.140	-0.180	-0.213
robust std err		0.015	0.048	0.026	0.113	0.045	0.015	0.019
pvalue		0	0.003	0.047	0.212	0.002	0	0.085